

# **Coal Ash Regulation The Need to Get the Basics Right**

By Richard Kinch

In looking at the EPA Coal Ash Rule as well as what States have and are doing to regulate coal ash, the issues get complex, and interested parties find resolving disputes essentially impossible. To help people unravel the regulatory intricacies, this paper walks through the most basic of concepts in environmental regulation, and illustrates how drifting from the appropriate basics creates regulatory and communication difficulties. In addition, this paper identifies how long-established Clean Water Act authorities and findings can be the dominant consideration with regard to coal ash surface impoundments, and how well-intentioned RCRA regulatory requirements may not address risk to human health and the environment for a significant segment. Finally, there are a few thoughts regarding how regulatory agencies could make appropriate adjustments.

## **RISK VERSUS TECHNOLOGY**

Regulations are developed based on two statutory structures. Some statutes direct EPA to develop risk-based criteria. This is the case for the RCRA Subtitle D authority for the Coal Ash Rule, which seeks “no reasonable probability of adverse effects on health or the environment”. Other statutes direct EPA to develop technology-based criteria. This is the case for the Clean Water Act’s regulation of industrial wastewaters, which for example specify criteria based on Best Available Technology, as well as the regulation of hazardous wastes under RCRA Subtitle C, which specifies the use of 2 liners with a leachate collection system, and that hazardous constituents should not migrate beyond the outer liner.

Even in the case of risk-based regulations, there may be provisions that reflect a technology EPA has determined is sufficient to meet risk-based criteria. This can be advantageous in that it removes the burden of having to substantiate that planned controls will meet the risk-based criteria. To utilize such technology components and maintain a risk-based rule, it is necessary to provide an alternative allowance to demonstrate, on a site-specific basis, that risk-based criteria will be met.

When a strict risk-based alternative is not provided, a rule that is protective of human health and the environment maybe imposing conditions on many sites that are unnecessary from a risk perspective. For example, the unlined coal ash surface impoundment with by far the highest Arsenic concentration sat on a massive formation of impermeable shale, was not a damage case, and was never going to be a groundwater problem. EPA’s hazardous waste RCRA program typically regulates where there is an undue risk at the 90<sup>th</sup> percentile – thus, a technology-based provision in a risk-based rule maybe unnecessary for up to 90% of the facilities. A few examples of technology-based criteria in the Coal Ash Rule were the setting of background levels for non-MCL constituents, requiring compliance groundwater monitoring at the waste unit boundary, and the resultant corrective action.

Requiring achievement of background levels for non-MCL constituents did not have a connection to protection of human health and the environment. While EPA, the Courts, citizens, and the press may all

tout coal ash contains toxics and the EPA limits are necessary to protect human health and the environment, this technology-based component is really a different construct under a risk-based statute. After about 3 ½ years, EPA appropriately corrected this situation by providing risk-based criteria for these constituents. Still, this drifting into technology-based criteria is an example of how difficulties arise.

As for the appropriate location of groundwater monitoring under a risk-based statute, the main concern is impacts associated with drinking water wells (the groundwater to surface water pathway will be addressed later in the paper). To pose undue risks, there needs to be actual exposure. Historically, this has raised the possibility of compliance monitoring occurring where there is a drinking water well, or at a point where there is some reasonable possibility of a future drinking water well (this would not preclude other monitoring locations to allow for early detection of potential risks). For the municipal solid waste landfill rule, there was the concept of compliance being on their property and no more than 150 meters from the unit. This entailed some consideration that receptors (or any reasonable concept of potential receptors) associated with groundwater contamination is really not at the waste unit boundary.

For coal ash surface impoundments, a very common situation is that the surface impoundment is placed near a surface water body, groundwater flow is towards the surface water, there is a small stretch of property (between the surface impoundment and the surface water) which is owned by the utility, there are no existing drinking water wells and no reasonable likelihood that a future drinking water well will be built in that area. For situations where there are drinking water wells or a reasonable future potential, environmental groundwater safeguards under the Coal Ash Rule are absolutely appropriate to protect human health. For a plentiful collection of sites with no existing or potential drinking water wells, however, a regulatory claim of addressing a statutory risk-based mandate is without substance. In focusing in on drinking water wells, it is certainly an easy matter to identify whether there are any existing wells in that critical space between the impoundment and surface water. It is largely obvious when looking at specific sites as to whether there is a reasonable possibility of a future drinking water well, but if there are doubts, regulatory bodies should conduct a basic investigation and data gathering regarding the building of new drinking water wells next to closed or operating coal ash impoundments.

As a separate matter, there has been the thought that one should not impose groundwater concentrations above criteria on someone else's property. Due to the mounding effect of the surface impoundment, it is possible to impact lateral properties (perpendicular to the normal groundwater flow). Of course, such circumstances warrant attention, and should be assessed. It should, however, be recognized that the mounding effects will have a limited footprint and in many cases are limited to the utility's property, where there are no drinking water wells. (While working on the Coal Ash Rule, there was one site that impacted the groundwater on a lateral neighboring property, which turned out to be a municipal landfill. There were no existing drinking water wells, and a reasonable person would not expect someone in the future to build a drinking water well right between a municipal landfill and a coal ash waste management unit.)

If the supporting regulatory statute goes beyond addressing environmental risk and supports preventing the degrading of other people's property, or for that matter any groundwater in the State, regardless as to whether there is any undue risk to human health and the environment, that is a different circumstance. With such non-risk-based statutory provisions, communications would be greatly aided if

a rationale for the structure is provided and people understand the non-risk-based objective. Such a justification can be difficult in the case of a coal ash surface impoundment where there are no drinking water wells and no surface water quality issues, as explained later.

The Coal Ash Rule, which has a risk-based statute, significantly dismisses the concept of risk and places groundwater compliance monitoring at the waste unit boundary. This is the practice adopted by the RCRA Subtitle C hazardous waste regulations, consistent with that statute's technology-based call for 2 liners and leachate collection with the intent that hazardous constituents should not migrate beyond the outer liner. This technology-based component under a Subtitle D risk-based statute is the basic and initial source of problems, misunderstanding, and conflict.

## **NEW VERSUS EXISTING WASTE MANAGEMENT UNITS**

Existing facilities and pollution control devices pose different conditions from their new counterparts. But with regard to pure risk-based criteria, the distinction between existing and new is essentially non-existent – both new and existing waste management units need to be designed and operated to protect human health and the environment. Technology-based conditions, however, have important differences with regard to implementation by new versus existing sources, and this is where the insertion of technology-based criteria under a risk-based statute can amplify problems, misunderstandings, and conflict.

A technology-based rule imposes limits that reflect what a technology can achieve – for example requiring limits based on the best available technology. EPA's industrial waste water rules are a good example of technology-based standards. In imposing technology-based standards, the basic design has been to apply them to new units or to situations where a control technology can readily be added to existing units (limits based on altering the design of a manufacturing operation were reserved for new facilities). Adding a liner or modifying the liner type at an existing coal ash surface impoundment is not a practical endeavor.

The technology-based decision to require compliance monitoring at the unit boundary, necessitates a look at how that was appropriately done for hazardous waste. Not only did the RCRA Subtitle C statute support this direction, it ended the ability of existing units that did not have a liner designed, constructed, and installed to prevent any migration out of the surface impoundment from receiving hazardous wastes. For new sources the statute and EPA's regulation identified 2 liners and a leachate collection system as necessary to prevent migration out of the surface impoundment. In the Coal Ash Rule the technology-based condition is applied to existing units that do not have the Subtitle C hazardous waste technology. While some existing coal ash waste management units may meet the RCRA Subtitle C technology-based criteria associated with monitoring at the unit boundary, the application of a RCRA Subtitle C hazardous waste technology-based criteria to coal ash waste management units, under a risk-based statute and where the hazardous waste technology of 2 liners and a leachate collection system is not applicable, is at best a strained concept.

## **TECHNOLOGY-BASED REFLECTIVE MONITORING**

It should be understood that even when applying technology-based conditions to existing units, the accepted approach is to monitor releases that reflect the performance of the technology. So, if a technology is added to a wastewater discharge or air emissions, the compliance measurement reflects new water or air emissions being released. In the case of the coal ash compliance point, however, EPA is attaching technology-based criteria (compliance monitoring at the unit boundary) to existing units for groundwater that was subject to prior releases, sometimes decades ago.

When monitoring and compliance are risk-based and directly address protecting human health and the environment, the monitoring and compliance are clearly inline with a well understood objective. For technology-based criteria, the structure can also be well understood for new waste management units – the owners knew the requirement and had the opportunity to appropriately design the unit, and are simply being held to something they had the opportunity to plan for. The difficulty arises with applying technology-based criteria to an existing source that can not practically install the technology and the compliance monitoring reflects prior practices. While the objective is understood if there is a risk-based criterion, it is difficult to understand and communicate for technology-based criteria at an existing unit that cannot practically install the technology and is being judged on historic releases. For example, historic groundwater concentrations that are not posing risks were acceptable, later they become unacceptable even though there were still no undue risks. That is a situation where simple concepts get lost, and communication difficulties flourish. (This is a little like passing emission tests on your older car for years, and then the authorities decide that all cars should meet levels achieved by electric cars. You cannot practically get your old car to perform at that level and agree to cease driving the car and have it dismantled. But, that is not enough for the authorities – there are extensive fines for exceeding the new emission level based on the records for prior years.) Again, such issues disappear when actual risks are the basis for environmental action.

## **SOUND SCIENCE**

During the development of the rule, EPA assessed the current waste management practices of landfills and surface impoundments. The findings were that surface impoundments were less likely to be lined and less likely to have groundwater monitoring. The take away was that lots of surface impoundments were not managing their wastes properly – for some unknown reason EPA assumed State authorities were much more negligent when it came to surface impoundments. If, however, States really do very good jobs protecting human health and the environment, there maybe sound scientific reasons for the differences between landfills and surface impoundments. The first factor is that surface impoundments are frequently located right next to surface water bodies. The scenario is that the groundwater flow is towards the surface water and often there are no drinking water wells between the surface impoundment and the surface water – nor is there a reasonable likelihood of such a future well, especially when the distance is relatively small and the land is owned by the utility. Thus, it was not an unreasonable environmental decision to find that the groundwater in many circumstances simply was not an environmental problem, because there were no receptors and no reasonable likelihood of future receptors.

Of course, the lack of existing and potential drinking water wells leaves the concern associated with the groundwater to surface water pathway. Why might a State not address that pathway and require more liners? From an environmental prospective, there is a rational explanation. Through the Clean Water

Act, the State is already regulating the larger volume pathway to the surface water, the NPDES discharge. (Note, as surface impoundments are being closed the units are discharging greater quantities of water that have leached constituents from coal ash, and such discharges are being found acceptable under the Clean Water Act.) States also assess water quality needs of the receiving stream. Thus, if there is not a water quality problem, there is no issue and if there is, it is identified and addressed by the Clean Water Act. Frankly, the ability of states to identify and address water quality issues is far easier and more rapid than modeling contaminant transport via the groundwater to surface water pathway over decades to thousands of years. The regulatory structure and evidence is that the Clean Water Act authorities are addressing the water quality issues.

The surface water quality situation with coal ash surface impoundments is more straightforward than impacts associated with landfills. While EPA regulated municipal landfills at a point up to 150 meters from the unit boundary, coal ash surface impoundments tend to be built close to surface water bodies, which intercept the groundwater flow. Without an existing or reasonably potential drinking water well, the environmental matter becomes a clear Clean Water Act surface water quality issue. Coal ash surface impoundments have NPDES Clean Water Act permits, the bulk of the release is via the direct discharge – water quality authorities can readily assess if the receiving surface water body is experiencing water quality problems. For existing sources, the monitoring of the surface water body will be the confirming data. For preventative action with regard to planned new releases, Clean Water Act authorities can assess whether drainage of the surface impoundment will impact surface water quality. As for the plans for a new impoundment, Clean Water Act authorities can readily assess the total release (NPDES discharge and the lesser groundwater to surface water contribution), and take appropriate action in issuing an NPDES permit. If they foresee surface water quality issues, they could force treatment via the NPDES permit or refuse to issue a permit, and thus putting an end to the surface impoundment plans. While the RCRA Coal Ash Rule is the new item, the Clean Water Act authorities exercise extensive control over surface water quality and have done so for decades. While water quality issues are extremely important and EPA identifies associated damage cases and risk analysis as part of the RCRA evaluation, the impressions given can be quite wrong. The Coal Ash Rule implies RCRA is needed to address surface water issues associated with coal ash surface impoundments. The reality is that surface water quality is already addressed by State programs – consistent with Clean Water Act statutory authority and decades of EPA/State coordination. For an existing surface impoundment, the water quality conditions have already been determined, and facilities appropriately informed and regulated. An implication that the RCRA Coal Ash Rule is somehow helping to determine whether there are water quality issues with the surface water would be a mistake. (As an analogy, if you periodically played the lottery, and the Federal government contacted you and said if you take certain actions, which are costly, they will clarify whether you had the winning ticket that is at least a year old. The State Gaming Authority is the responsible party, they already handled it, and the new contact does not add value for this task.) Given water quality assessments should already exist for sites, the Coal Ash Rule, under a risk-based statute should not be seeking actions to address a possible concern that has been found not to exist – the RCRA regulatory requirements need to display a basic level of coordination with Clean Water Act implementation.

One of the problems associated with drifting away from a disciplined risk-based structure is that people can readily lose perspective on what regulations are actually accomplishing. A revealing illustration is to

look at what the Coal Ash Rule's technology-based components accomplish for a for a very common scenario associated with coal ash surface impoundments. The scenario, is where:

- the Clean Water Act NPDES regulatory authority has found that there is not a surface water quality problem,
- groundwater flow is from the surface impoundment towards a nearby surface water body,
- the intervening land does not contain a drinking water well nor is there a reasonable likelihood of a future drinking water well (this can be quite possible where the utility owns the land that the distance is small), and
- mounding effects are not causing groundwater impacts on properties not owned by the utility.

Under a Subtitle D risk-based statute, it would be appropriate for EPA to look at a coal ash surface impoundment where there are no existing or reasonably potential drinking water wells and no surface water quality issues, and limit requirements to those that actually have potential environmental benefits – for this situation, Clean Water Act authorities are handling surface water quality and RCRA action may be limited to dam safety. The Coal Ash Rule, however, finds that such scenarios need a synthetic liner. From a protection of human health and the environment, it maybe shocking, but in this scenario, liners may make little sense. If the Clean Water Act authority is ok with regard to surface water quality and there is no drinking water well (or reasonable potential for one) then there is not a risk issue. As for the synthetic liner in this scenario, a look at one of the most basic scientific principles, a simple water balance, is quite revealing. A water balance in this situation would be that what goes into the surface impoundment (the coal ash slurry, rainfall, and any other wastewater streams the utility discharges to the impoundment) equals what goes out of the surface impoundment (the NPDES discharge, leakage to groundwater, and evaporation) minus accumulation. First of all, it is reasonable to assume the operation of a no liner versus liner situation would not result in a change in rainfall, the industrial discharges to the surface impoundment, evaporation, or accumulation. By stopping the leaking, the release to groundwater now becomes part of the NPDES discharge. Again, there is not a risk issue due to the lack of drinking water wells (or potential wells), or with the surface water quality based on Clean Water Act regulators. The actual accomplishment of installing a liner in this scenario is that the surface water (the point where there can be contact with receptors) that used to receive releases from two pathways, now more rapidly receives essentially the same release via one pathway.

The Coal Ash Rule's corrective action structure for this scenario (no existing or potential drinking water wells and no water quality issues) also creates an environmentally questionable result. Under the Coal Ash Rule, even if there is no actual risk, groundwater criteria still need to be met at the unit boundary. A strong candidate for such corrective action is to accelerate recovery of the groundwater (beyond that achieved by closure) by installation of groundwater removal wells and subsequent discharge to the surface water. The process, in simple terms, is taking groundwater pollutants that are slowly migrating to the surface water body and more quickly releasing them to the surface water. There was no actual risk before or after the corrective action, there are significant costs associated with such corrective action, and it is puzzling what is environmentally being accomplished. RCRA targeting of groundwater protection where there are drinking water wells (and some reasonable concept of potential drinking water wells) should be the appropriate regulatory target.

## POTENTIAL ACTION BY REGULATORS

First of all, it is difficult for many to admit to flaws in their regulatory work, and even if that occurs, it is not easy to change things. There are 3 suggestions centered around getting the regulatory basics right:

- **Amend Regulations** - In an ideal situation, the Coal Ash Rule should be amended to provide risk-based options, consistent with its statutory RCRA Subtitle D authority. The rule's groundwater protection provisions should focus on there being an existing or reasonably potential drinking water well. As for surface water impacts, there is clearly no RCRA value added when the Clean Water Act authorities have determined there are not water quality issues. If surface water quality issues have been identified, the Clean Water Act authorities can address the situation, and it is not clear how RCRA adds value – although that issue could certainly be explored with EPA's Office of Water – possibly providing groundwater corrective action, solely where other conditions imposed under the Clean Water Act are not sufficient.
- **Allow Meaningful Implementation** – Even if there is a willingness to amend regulations, that will take time, and in the interim there will be opportunities to inject some meaningful implementation decisions. When an existing unit violates groundwater criteria that is not associated with actual risk (no existing or potential drinking water wells and no water quality issues), corrective action will likely take a long time to achieve the regulatory criteria. With no actual risks, authorities should strongly consider limiting action to allowing the facility to cease waste placement, dewater, and cap the unit, or close the unit by removal of the coal ash. These are the most effective and expensive steps. While additional costly actions can be taken to accelerate the process (such as extracting groundwater and discharging into the surface water body), they seem to serve no fair purpose for an existing coal ash impoundment that is not actually causing risks.
- **Temper Public Anxiety** - Communicate better where and why regulations drift from being truly risk-based. Explain the basics of environmental risk, and how some common coal ash surface impoundment situations may not pose certain risks.

## CONCLUSIONS

Environmental dialogue can be quite difficult. The public likely believes all coal ash regulatory provisions are addressing serious risk to human health and the environment, and is not aware that in many situations there are no actual risks (no existing or potential drinking water wells and no water quality issues). There also appears to be a significant lack of appreciation for regulatory controls associated with coal ash surface impoundment wastewaters and surface water quality that have been in place for decades under the Clean Water Act. If the Coal Ash Rule was strictly inline with the risk-based statutory authority of RCRA Subtitle D, I expect many of the difficulties would not have occurred. A risk-based focus would consider real circumstances regarding the presence of existing or reasonably potential drinking water wells and the status of the surface water quality. While it would have been a straightforward task to establish a risk-based structure, the introduction of technology-based conditions not only caused problems, it created barriers where parties are assuming risk benefits accrue that are disconnected in technology-based regulatory structures. There is nothing inherently wrong with a

technology-based structure, but it should be an outgrowth of the statutory authority, and needs to be implemented better.

Some may look positively at the notion that all efforts to reduce pollutant releases are good. The Clean Water Act supports that general concept with a goal to eliminate the discharge of pollutants into the nation's waters. The Clean Water Act, however, has specific technology-based features, considers cost, and deals appropriately with technical issues such as existing versus new units. Supporting general environmental concepts should not occur without careful consideration of the specific conditions being addressed. For coal ash, where there are no existing or potential drinking water wells and no water surface quality issues, costly environmental actions should have definable benefit. Having a surface impoundment liner consolidate transport of pollutants to the surface water or corrective action that simply accelerates moving groundwater pollutants to surface water, are not definable environmental benefits. The right environmental actions, that are derived from sound science, and achieve well understood benefits, should be the regulatory objectives (such as addressing existing and potential drinking water wells with appropriate risk-based criteria). Hopefully, this look at the very basic regulatory principles will provide people with a clearer understanding of the coal ash regulation, and enable a better, more informed dialogue.